

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

CARTER, James T.

Serial No.: Unassigned

Group:

Filed: Concurrently

Examiner:

FOR: MACROPOROUS HYPERHYDROXY POLYMER AND ARTICLES MADE THEREFROM

Date: December 14, 2000

The Hon. Commissioner of
Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination of the herewith filed Divisional application, please amend the application as follows:

IN THE SPECIFICATION

Before "FIELD OF THE INVENTION" insert the following:

--This application is a divisional of prior application
Serial No. 09/151,111.--

Delete Paragraph 12 and replace with the following:

The macroporous hyperhydroxy polymer comprises: 40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, 40-60 parts by weight of a methacrylic acid, up to 5 parts by weight of a polymerization initiator, wherein the molar ratio of the purified monoester of hydroxyalkyl acrylate to the methacrylic acid is from 1:1 to

2.3:1, and the polymer is capable of holding 90-99.75% water.

Delete Paragraph 13 and replace with the following:

The polymer is useful in a method of preparing articles from the macroporous hyperhydroxy polymer essentially comprising substantially similar fractions of functional acrylic monomers, which method comprises, mixing substantially similar fractions of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond and a methacrylic acid with a sufficient amount of a polymerization initiator, holding the mixture under polymerization conditions to form a polymer gel, and casting the polymer gel to shape, whereby the article is capable of holding 90-99.75% water.

Delete paragraph 14 and replace with the following:

The polymer exhibits utility in a variety of fields including as a coating for surface treatments such as anti-icing materials, lubricants and the like, as a soil hydratant, as dermatological devices such as bandages, burn dressings, and the like, as chemical transport membranes, as biological implants, and as spill recovery materials. However, a principal use of the polymer is in the fabrication of soft contact lenses which comprise the macroporous hyperhydroxy polymer prepared by polymerizing a mixture comprising 40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, and 40-60 parts by weight of a methacrylic acid, wherein the lens exhibits a water content of from 90-

99.75%.

Delete Paragraph 24 and replace with the following:

The polymer is produced from a monomer mixture comprising 40-60 parts by weight of a purified monoester of a hydroxyalkyl alkyl acrylate having a single olefinic double bond, 40-60 parts by weight of a methacrylic acid, and .001-5 parts by weight of a polymerization initiator. Polymerization is accomplished by the conventional techniques of bulk polymerization, solution polymerization, suspension polymerization or emulsion polymerization. The polymerization technique used is dependent upon the volume of polymer required and the nature of the final product being produced. The resulting product is a stereospecific isotactic heterogenous copolymer product of a thermoset resin hydrogel in which the molar ratio of monoester to methacrylic acid is within the range of 1:1 to 2.3:1, preferably 1.5:1, and wherein the pore diameter of the polymer is greater than 90 Angstroms.

Delete Paragraph 25 and replace with the following:

As the monoester of a hydroxyalkyl acrylate having a single olefinic double bond, acceptable compounds include, but are not limited to, 2-hydroxyethyl methacrylate, glyceryl methacrylate, 2-hydroxypropyl methacrylate, glycidyl methacrylate, 2-hydroxyethyl acrylate, and 2-hydroxypropyl acrylate. Acceptable methacrylic acid includes dimethacrylates.

Delete Paragraph 27 and replace with the following:

In addition to the substantially similar fractions of the

monoester and methacrylic acid, the monomer mixture may be enhanced with trace amounts of a longer chain alkyl acrylate or methacrylate ester comonomer such as cyclohexyl methacrylate, trimethylolpropane trimethacrylate or ethyleneglycol dimethacrylate. Such additional comonomers enhance the polymer crosslinking for situations where added polymer strength is desired. The trace amounts of these comonomers are generally less than 0.1% by weight of the total monomer mixture.

IN THE CLAIMS

Please cancel claims 1-8 in their entirety and without prejudice.

Please amend claim 9 as follows:

9. (Amended) A method of preparing an article from a macroporous hyperhydroxy polymer essentially comprising substantially similar fractions of functional acrylic monomers, which comprises:

a) mixing substantially similar fractions of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond and a methacrylic acid with a sufficient amount of a polymerization initiator,

b) holding the mixture under polymerization conditions to form a polymer gel, and

c) casting the polymer gel to shape,
whereby the article is capable of holding 90-99.75% water.

Please amend claim 16 as follows:

16. (Amended) A soft contact lens comprising a macroporous hyperhydroxy polymer prepared by polymerizing a mixture comprising:

a) 40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, and

b) 40-60 parts by weight of a methacrylic acid, wherein the lens exhibits a water content of from 90-99.75%.

REMARKS

Entry of the foregoing amendments and favorable consideration of the subject invention are respectfully requested in view of the following comments.

Claims 1-8 have been cancelled and claims 9 and 16 have been amended. Accordingly, claims 9-20 are pending in this application

Claims 9 and 16 have been amended to limit the ingredient (b) of the macroporous hyperhydroxy polymer of the invention to "a methacrylic acid", which is shown in the examples of the invention. Concurrently therewith, the specification has been amended so that all references to the "olefinic acid diester containing two olefinic double bonds" have been deleted and replaced with "a methacrylic acid". In this manner, the claims and the disclosure have been limited to the scope of the specific

examples as given in the application as originally filed.

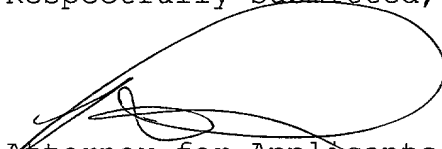
Applicant respectfully submits that, inasmuch as the examples specified a methacrylic acid as the ingredient (b) of the macroporous hyperhydroxy polymer of the invention, amendment of the specification to so limit the disclosure is fully supported and does not add new matter.

In addition, inasmuch as the examples referenced methacrylic acid as the ingredient (b), amendment of the claims to recite methacrylic acid is likewise proper and within the scope of the application as originally filed.

In accordance with 37 CFR §1.121, as recently amended, this amendment is accompanied by separate pages providing marked-up versions of the replacement paragraphs 12, 13, 14, 24, 25 and 27, and of amended claims 9 and 16.

Early and favorable consideration of this application is respectfully requested.

Respectfully submitted,



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Marked-up Paragraphs

Paragraph 12.

The macroporous hyperhydroxy polymer comprises:
40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, 40-60 parts by weight of [an olefinic acid diester containing two olefinic double bonds] a methacrylic acid, up to 5 parts by weight of a polymerization initiator, wherein the molar ratio of the purified monoester of hydroxyalkyl acrylate to the [olefinic acid diester] methacrylic acid is from 1:1 to 2.3:1, and the polymer is capable of holding 90-99.75% water.

Paragraph 13.

The polymer is useful in a method of preparing articles from the macroporous hyperhydroxy polymer essentially comprising substantially similar fractions of functional acrylic monomers, which method comprises, mixing substantially similar fractions of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond and [an olefinic acid diester containing two olefinic double bonds] a methacrylic acid with a sufficient amount of a polymerization initiator, holding the mixture under polymerization conditions to form a polymer gel, and casting the polymer gel to shape, whereby the article is capable of holding 90-99.75% water.

Paragraph 14.

The polymer exhibits utility in a variety of fields including as a coating for surface treatments such as anti-icing materials, lubricants and the like, as a soil hydratant,

as dermatological devices such as bandages, burn dressings, and the like, as chemical transport membranes, as biological implants, and as spill recovery materials. However, a principal use of the polymer is in the fabrication of soft contact lenses which comprise the macroporous hyperhydroxy polymer prepared by polymerizing a mixture comprising 40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, and 40-60 parts by weight of [an olefinic acid diester containing two olefinic double bonds] a methacrylic acid, wherein the lens exhibits a water content of from 90-99.75%.

Paragraph 24

The polymer is produced from a monomer mixture comprising 40-60 parts by weight of a purified monoester of a hydroxyalkyl alkyl acrylate having a single olefinic double bond, 40-60 parts by weight of [an olefinic acid diester containing two olefinic double bonds] a methacrylic acid, and .001-5 parts by weight of a polymerization initiator. Polymerization is accomplished by the conventional techniques of bulk polymerization, solution polymerization, suspension polymerization or emulsion polymerization. The polymerization technique used is dependent upon the volume of polymer required and the nature of the final product being produced. The resulting product is a stereospecific isotactic heterogenous copolymer product of a thermoset resin hydrogel in which the molar ratio of monoester to [diester] methacrylic acid is within the range of 1:1 to 2.3:1, preferably 1.5:1, and wherein the pore diameter of the polymer is greater than 90 Angstroms.

Paragraph 25.

As the monoester of a hydroxyalkyl acrylate having a single olefinic double bond, acceptable compounds include, but are not limited to, 2-hydroxyethyl methacrylate, glyceryl methacrylate, 2-hydroxypropyl methacrylate, glycidyl methacrylate, 2-hydroxyethyl acrylate, and 2-hydroxypropyl acrylate. Acceptable [olefinic diesters are those of] methacrylic acid[, i.e.,] includes dimethacrylates[, preferably shorter chain diesters].

Paragraph 27.

In addition to the substantially similar fractions of the monoester and [diester] methacrylic acid, the monomer mixture may be enhanced with trace amounts of a longer chain alkyl acrylate or methacrylate ester comonomer such as cyclohexyl methacrylate, trimethylolpropane trimethacrylate or ethyleneglycol dimethacrylate. Such additional comonomers enhance the polymer crosslinking for situations where added polymer strength is desired. The trace amounts of these comonomers are generally less than 0.1% by weight of the total monomer mixture.

Marked-up Claims

9. (Amended) A method of preparing an article from a macroporous hyperhydroxy polymer essentially comprising substantially similar fractions of functional acrylic monomers, which comprises:

a) mixing substantially similar fractions of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond and [an olefinic acid diester

containing two olefinic double bonds] a methacrylic acid with a sufficient amount of a polymerization initiator,

b) holding the mixture under polymerization conditions to form a polymer gel, and

c) casting the polymer gel to shape,

whereby the article is capable of holding 90-99.75% water.

16. (Amended) A soft contact lens comprising a macroporous hyperhydroxy polymer prepared by polymerizing a mixture comprising:

a) 40-60 parts by weight of a purified monoester of a hydroxyalkyl acrylate having a single olefinic double bond, and

b) 40-60 parts by weight of [an olefinic acid diester containing two olefinic double bonds] a methacrylic acid,

wherein the lens exhibits a water content of from 90-99.75%.